Contract Specifications for Hopper Dredge Use

Hopper Dredge Equipment

Hopper dredge drag heads shall be equipped with rigid sea turtle deflectors which are rigidly attached. No dredging shall be performed by a hopper dredge without a turtle deflector device that has been approved by the Contracting Officer (CO). (A conceptual design detail of a turtle deflector is appended to the end of this section).

Deflector Design

The leading V-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be installed in the deflector to prevent structural failure of the device. The leading edge of the deflector shall be designed to have a plowing effect of at least 6" depth when the drag head is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to insure the critical “approach angle”.

(Information Only Note: The design "approach angle" or the angle of lower drag head pipe relative to the average sediment plane is very important to the proper operation of a deflector. If the lower drag head pipe angle in actual dredging conditions varies tremendously from the design angle of approach used in the development of the deflector, the 6" plowing effect does not occur. Therefore, every effort should be made to insure this design "approach angle" is maintained with the lower drag pipe.)

If adjustable depth deflectors are installed. They shall be rigidly attached to the drag head using either a hinged aft attachment point or an aft trunnion attachment point in association with an adjustable pin front attachment point or cable front attachment point with a stop set to obtain the 6” plowing effect. This arrangement allows fine-tuning the 6" plowing effect for varying depths. After the deflector is properly adjusted there shall be NO openings between the deflector and the drag head that are more than 4" by 4".

Inflow Basket Design

The Contractor shall install baskets or screening over the hopper inflow(s) with no greater than 4" x 4" openings. The method selected shall depend on the construction of the dredge used and shall be approved by the Contracting Officer’s Representative prior to commencement of dredging. The screening shall provide 100% screening of the hopper inflow(s). The screens and/or baskets shall remain in place throughout the performance of the work.

The Contractor shall install and maintain floodlights suitable for illumination of the baskets or screening to allow the observer to safely monitor the hopper basket(s) during non-daylight hours or other periods of poor visibility. Safe access shall be provided to the inflow baskets or screens to allow the observer to inspect for turtles, turtle parts or damage.

The turtle deflector device and inflow screens shall be maintained in operational condition for the entire dredging operation.

Hopper Dredge Operation

The Contractor shall operate the hopper dredge to minimize the possibility of taking sea turtles and to comply with the requirements stated in the Incidental Take Statement provided by the National Marine Fisheries Service in their Biological Opinion.

When initiating dredging, suction through the dragheads shall be allowed just long enough to prime the pumps, then the dragheads must be placed firmly on the bottom. When lifting the dragheads from the bottom, suction through the dragheads shall be allowed just long enough to clear the lines, and they must cease. Pumping water through the dragheads shall cease while maneuvering or during travel to/from the disposal area.

(Information Only Note: Optimal suction pipe densities and velocities occur when the deflector is operated properly. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency which reduces total dredging hours and "turtle takes." The operation of a drag head with teeth must be monitored for each dredged section to insure that excessive material is not forced into the suction line. When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators should configure and operate their equipment to eliminate all low level suction velocities. Pipe plugging in the past was easily corrected when low suction velocities occurred by raising the drag head off the bottom until the suction velocities increased to an appropriate level. Arrangements of teeth and/or the reconfiguration of teeth should be made during the dredging process to optimize the suction velocities.)

Raising the drag head off the bottom to increase suction velocities is not acceptable. The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure that suction velocities do not drop below appropriate levels, the Contractor's personnel shall monitor production meters throughout the job and adjust primarily the number and opening sizes of water ports. Water port openings on top of the drag head or on raised stand pipes above the drag head shall be screened before they are utilized on the dredging project. If a dredge section includes sandy shoals on one end of a tract line and mud sediments on the other end of the tract line, the Contractor shall adjust the equipment to eliminate drag head pick-ups to clear the suction line.

Near the completion of each payment section, the Contractor shall perform sufficient surveys to accurately depict those portions of the acceptance section requiring cleanup. The Contractor shall keep the drag head buried a minimum of 6 inches in the sediment at all times. Although the over depth prism is not the required dredging prism, the Contractor shall achieve the required prism by removing the material from the allowable over depth prism.

During turning operations the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists.

These operational procedures are intended to stress the importance of balancing the suction pipe densities and velocities in order to keep from taking sea turtles. The Contractor shall develop a written operational plan to minimize turtle takes and submit it as part of the Environmental Protection Plan.

The Contractor must comply with all requirements of this specification and the Contractor's accepted Environmental Protection Plan. The contents of this specification and the Contractor's Environmental Protection Plan shall be shared with all applicable crew members of the hopper dredge.

Recording Charts for Hopper Dredges. All hopper dredges shall be equipped with recording devices for each drag head that capture real time, drag head elevation, slurry density, and at least two of the following: Pump(S) slurry velocity measured at the output side, pump(S) vacuum, and/or pump(s) RPM. The Contractor shall record continuous real time positioning of the dredge, by plot or electronic means, during the entire dredging cycle including dredging area and disposal area. Dredge location accuracy shall meet the requirements of the Corps of Engineers Engineering Manual (EM) 1110-2-1003 dated 28 February 1991, "Hydrographic Surveying". A copy of the EM will be available for review by prospective bidders during the bid period. The recording system shall be capable of capturing data at variable intervals but with a frequency of not less than every 60 seconds. All data shall be time correlated to a 24 hour clock and the recording system shall include a method of daily evaluation of the data collected. Data shall be furnished to the Contracting Officer Representative for each day's operation on a daily basis. A written plan of the method the Contractor intends to use in order to satisfy these requirements shall be included with the Contractor's Quality Control Plan.

The Contractor shall visually display and record continuous real time positioning of the dredge, by plot or CRT screen, during the entire dredging cycle including dredging area and disposal area. Dredge location

accuracy shall meet the requirements of the Corps "Manual of Survey Instructions". A written discussion of the method the Contractor intends to use in order to satisfy these requirements shall be included with the standard preconstruction submittal package.

DISPOSAL OF EXCAVATED MATERIAL

The Contractor shall be required to furnish an electronic surveillance feature of the movement of and disposition of the excavated material. This surveillance feature shall monitor the disposal vessel by means of an automated (computer) system that will continuously track the horizontal location and draft condition of the disposal vessel for the entire dredging cycle including dredging area and disposal area. The required data shall be as follows:

A. Date
B. Trip I.D.
C. Vessel name and name of vessel's captain.
D. Location and draft of disposal vessel every five minutes (at least) during loading cycle and during travel to disposal area and (at least) every minute or every 200 feet of travel, whichever is smaller, while in the vicinity (within 1000 feet) of the disposal area.

Horizontal location shall have an accuracy equal to or better than a standard DGPS system, equal to or better than ± 10 feet (horizontal repeatability). Vertical data (draft) shall have an accuracy of ± ½ foot. Horizontal and vertical location data shall be collected in sets and each data set shall be referenced to local date and time (to the nearest minute) and shall be referenced to the same geographic reference system used for the survey(s) shown in the contract plans.

All data shall be collected and stored on 3½ inch floppy disks in ASCII format. The data collected while the disposal vessel is in the vicinity of the disposal area shall be plotted in chart form, in 200 foot intervals, to show the track and draft of the vessel approaching, through, and leaving the disposal area. More than one disposal area trip may be stored onto a single floppy disk as long as the data for each trip is indexed and clearly identifiable. The original floppy disks, when full or complete, shall be furnished to the Contracting Officer or his representative within 24 hours. The plotted charts shall be organized and maintained at a central work location for inspection on a daily basis by the Contracting Officer or his representative. At the end of each week of operations the Contractor shall orderly bind-up the plotted charts and submit them to the Contracting Officer or his representative for permanent file record.

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